

22.

SMALL-POX

IN SCOTLAND,

AS IT IS, WAS, AND OUGHT TO BE;

WITH

HINTS FOR ITS MITIGATION BY LEGISLATIVE ENACTMENT.

BY

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SMALL-POX IN SCOTLAND.

I. SMALL-POX AS IT IS.

§ 1. WHETHER rightly or wrongly, an impression prevails extensively among the public that small-pox is steadily on the increase; that the protective power of vaccination has diminished; and that we are rapidly drifting back into that state in which the close of last century found us, when the “annual ravages of small-pox in Europe alone have been estimated at half a million of lives.”¹ It were not difficult to show that there is no foundation for any such dread; that there is no reason to believe that the protection afforded by vaccination has diminished; or that small-pox has increased to such an extent as to give the least occasion for any fear that it will regain its former fearful power. At the same time, there is abundant evidence to show that, by our criminal apathy and carelessness, valuable lives are being continually sacrificed; long and tedious sickness, and often death itself, introduced into families; deteriorated constitutions rendered a permanent affliction to the survivors, and an unhealthy offspring entailed on posterity; and this to an extent which by a little vigilance and care could easily be prevented.

§ 2. But the question must be dealt with as one of facts;—the data are easily gathered from the registration returns for Scotland, which have now been in operation for the last five years. As yet, however, these returns are limited to the eight principal towns in Scotland.

¹ See the admirable and exhaustive Report of Mr Simon on Vaccination, laid before the Board of Health, and presented to both Houses of Parliament in 1857.

TABLE I.

Total Annual Mortality in the Eight Principal Towns of Scotland from Small-Pox, for the last Five Years.

Year.	Glasgow.	Edinburgh.	Dundee	Aberdeen.	Paisley.	Greenock.	Leith.	Perth.	Total.
1855	33	8	113	1	...	18	4	2	179
1856	129	133	229	65	51	7	27	4	645
1857	405	67	7	5	33	18	61	2	598
1858	115	36	3	9	5	1	6	...	175
1859	200	168	2	17	2	31	45	1	466
Total	882	412	354	97	91	75	1 43	9	1993

TABLE II.

§ 3. *Deaths by Small-Pox, as compared with those by Scarlet Fever, Hooping-Cough, and Measles, in Edinburgh, Glasgow, Aberdeen, Dundee, in 1856.*

	Small-Pox.	Scarlet Fever.	Hooping-Cough.	Measles.	Deaths from all Causes.
Edinburgh...	133	446	58	118	4136
Glasgow.....	129	358	928	139	10,280
Aberdeen	65	54	86	2	1659
Dundee	229	163	120	177	2453

A third table will be necessary subsequently, and may for convenience be inserted here.

TABLE III.

§ 4. *Deaths from the above Four Diseases at Four Periods of Life in the Eight Principal Towns of Scotland, Year 1856.*

Causes of Death.	Years of Age.				
	0—5.	5—20.	20—60.	60, etc.	Total.
Small-Pox.....	531	62	52	...	645
Measles.....	465	36	501
Scarlet Fever.....	1003	346	22	...	1371
Hooping-Cough	1283	62	2	1	1348

§ 5. From these tables the following inferences may be safely deduced :—

1st, That the disease is not steadily increasing year by year ; but that it fluctuates in frequency and fatality just as it did before the discovery of vaccination.

2d, That at one time it prevails extensively in one town ; at another, it leaves it and ravages another. Thus in 1856 Dundee, and in 1857 Glasgow and Leith, were the towns principally affected by it.

3d, That taking the year 1856, when small-pox was epidemically present, out of a total estimated population of 854,066 individuals, 645 died of small-pox.

4th, That the total mortality from all causes being in that year 22,248, the deaths from small-pox (645) thus constituted 2·8 per cent., which is double the average of London for the last ten years, or of England and Wales for the last seven, and fourteenfold the average of Bohemia and Lombardy.

5th, That a large proportion of that mortality (229 deaths) occurred in the town of Dundee, where, in the single month of January, 95 individuals died from small-pox ; alluding to which, the Registrar-General observes, “The deaths from this single disease constituted not less than 30 per cent. of the total mortality,—a mortality which has been exceeded by no single disease during the last ten years, with the exception of the epidemic typhus in the month of November 1847, and the fatal cholera epidemic of 1849, when the deaths from that disease, during the months of July, August, and September, numbered respectively 209, 420, 159.”

6th, The calculations of Dr Seaton, appended to Mr Simon’s Report, enables us to view these figures comparatively ; and it appears that, “taking the mortality of this town (Dundee) from small-pox for the entire year, it was proportionally more than three times greater than the highest mortality which has taken place in London for the last ten years ; viz., that in 1848, when the deaths amounted to 1617, which is above double the annual average of the metropolis ; but had the deaths taken place in the same proportion to population as in Dundee in 1856, they would have amounted to upwards of 5000.”

§ 6. The tables on which the preceding remarks have been founded are limited to the eight principal towns in Scotland, from which alone full returns are published. They do not, therefore, give by any means an accurate idea of the state of matters in the smaller towns and rural districts.

Thus, the following paragraph is extracted from the *Scotsman* newspaper of 28th December :—

“*Haddington—Prevalence of Small-Pox.*—This disease continues to prevail here to a most unusual extent, as may be inferred from the fact that it has proved fatal in no fewer than ten cases during the three first weeks of the present month. It is worthy of remark that of this number not one single individual was ever vaccinated. A large number of the adult population of the town have got themselves re-vaccinated since the disease made its appearance.”—*Haddingtonshire Courier*.

This is sometimes indicated in the District Registrars' Notes, appended to the Quarterly Returns. Thus, in the first quarter of 1855, we find—

“I should consider the deaths in the month of February above the average, which I would attribute to the prevalence of small-pox and measles in the district of Galashiels or Ladhope.”

Again, in the Registrar-General's Quarterly Report, for quarter ending June 1855, we find—

“This loathsome disease (small-pox) has, owing to the neglect of vaccination, broken out in rather a virulent form in several parts of Scotland, and largely increased the mortality. At Bathgate, in Linlithgow, it nearly doubled the mortality of the previous quarter. It broke out among the militia at Fort George (Ardersier), apparently, however, in a modified form; and in several towns and parishes in the counties of Forfar, Fife, Selkirk, Dumfries, etc., it has added considerably to the mortality.”

In the same report, under the head of “Methven,” it is recorded :—

“Small-pox was imported into the parish during the quarter, and one man and three children died of it.” And, under “Bathgate :” “In last quarter the deaths were only 28, in this one they are 47. The difference is caused by the prevalence of small-pox in the parish, especially among children.”

Again, in the Registrar-General's Report for the quarter ending March 1856, he observes :—

“Small-pox, with its chief centre at Dundee, manifested itself pretty extensively over the East Midland and West Midland, extending also to some of the South-Western Counties.”

Again, in the last Quarterly Report for the same year, 1856, he says :—

“Small-pox has been very general over Scotland, and caused the loss of many lives.”

In the first Quarterly Report for 1857 we find—"Small-pox has broken out at different parts of the country."

And in looking at the places, not included in the eight large towns, where the local Registrars report the existence of small-pox, we find among them Glenshiell, Laggan, Aberdour, Denny ("an epidemic of small-pox to a considerable extent"), Livingstone, Hawick ("very prevalent").

For the quarter ending June 30th it is reported:—"Small-pox manifested itself in several districts," among which were "Dingwall, the Cumbrae Islands, Dean, Castleton." In the succeeding quarter, it is remarked upon by the local Registrars of Latheron, Alyth.

In 1859, the Registrar, in reporting the second quarter, states,— "Small-pox has assumed the epidemic form, and not only attacked large numbers of the population, but has proved fatal in many cases." From the "Registrars' Notes," we find that in "Eastwood, Renfrewshire, small-pox prevails to a great extent, both young and old being seized. In most cases it is mild, but there have been nine deaths from it, eight children and one married woman." "Annan. Small-pox has been very prevalent in the burgh since February last. Out of twenty-five deaths in the burgh during the quarter, nine have been from small-pox." "Half-Morton. Small-pox appeared in the parish about the beginning of the quarter."

In the quarter ending Sept. 30, 1859, no allusion is made to it by the Registrar-General in his report, but from the "Registrars' Notes" we glean the following:—"Fraserburgh. Small-pox has prevailed here during nearly the whole quarter." "Cockpen. Small-pox has been very prevalent during this quarter among the young; a considerable number of adults have also been attacked."

That the country is now fully alive to the extent of the evil, may be inferred from the mention made of it in various quarters.

Thus, in the Report of the Registrar-General for November 1859, we read:—

"51 Deaths were ascribed to small-pox in the eight towns, Edinburgh and Glasgow being the towns where that disease was most fatal, 3·2 per cent. of the deaths in Glasgow, and 4 per cent. of the deaths in Edinburgh, being caused by that disease.

In the Report for December 1859 it is thus more fully alluded to:—

"Small-pox, which has assumed the epidemic form in Glasgow, Edinburgh, and Greenock, and is threatening to do the same at Aberdeen, caused 104 deaths, and thus constituted $4\frac{1}{2}$ per cent. of the mortality in the eight towns. Most of the victims of that disease had never been vaccinated, and to this neglect the mortality is

chiefly to be ascribed. In Aberdeen the mortality from small-pox constituted 2·3 per cent. of the deaths ; in Edinburgh, 4 per cent. ; in Glasgow, 5 per cent. ; but in Greenock no less than 15·3 per cent. Of the 59 deaths from small-pox in Glasgow, 15 occurred in Clyde District, 10 in the Central, 10 in Anderston, 6 in Milton, 5 in Tradeston, 5 in Calton, 4 in the High Church, 3 in Hutchesontown, 1 in Blythswood, and none in Bridgeton District. Of the 16 deaths from that disease in Edinburgh, 8 occurred in the Canon-gate, 4 in St Giles, 3 in St George's, 1 in St Andrew's, and none in Newington District. Of the 23 deaths in Greenock, 14 happened in the Middle, 9 in the West, and none in the East District."

§ 7. In the Report by the Committee of Management of the Royal Infirmary its prevalence is thus alluded to :—

"In making this general statement regarding the state of public health, the Managers have, with reference to the absence of epidemics, to make an exception of small-pox, which, as in the country generally, has been prevalent for some time in this city.

"They have found, during the prevalence of this disease, the greatest benefit from a change made a considerable number of years ago, in the setting apart two wards for those affected by it. The number of small-pox patients admitted during this year was 130, and during last year 22."

And again, in the Report by the Committee of Contributors laid before the general body, at the meeting of _____ it is thus referred to :—

"Your Committee have noticed, with much regret, the largely increased number of cases of that malignant disease, the small-pox, which have risen from 22 last year, to 130 this year. They have also remarked, in the recent Report of the Glasgow Royal Infirmary, that a similar spread of this disease has just taken place in that city : and the last Report of the Registrar-General states, that both Aberdeen and Greenock have been afflicted by the same visitation.

"As it is well known, that ever since the days of Jenner, no disease can be more certainly warded off, or at least mitigated, than small-pox, if the simple preventive measure of vaccination be used ; and as the want of that precaution compromises very dangerously the public health of the community, your Committee would respectfully invite the attention of the Managers to the consideration whether they might not—either by themselves or in connection with some of the medical authorities of Edinburgh—bring this subject under the notice of the Lord Advocate, in the hope that his Lordship may use his influence in passing some legislative measure to

render vaccination compulsory upon all classes in Scotland, as it is believed already to be in England. In a matter which is plainly a department of Medical Police, it would humbly appear to your Committee, that the authority of Parliament could be most legitimately exerted with the cordial approbation of the public.”¹

The Report of the Managers of the Glasgow Royal Infirmary, presented to the contributors on the 2d January 1860, contains the following sentences:—

“*Small-pox.*—The number of children vaccinated during the year was 739, and the total number vaccinated since the commencement of vaccination in the Infirmary, on the 19th October 1857, has been 1822. The epidemic of small-pox in 1857, in consequence of which the managers were induced to institute a system of free vaccination in connection with the Dispensary, and to memorialize the Lord Advocate to bring into Parliament a measure to render vaccination compulsory, as in England and elsewhere, has, after a period of two years of comparative immunity from this dreadful scourge, been succeeded by a similar visitation in 1859, which threatens to be one of equal if not greater severity than that which was then experienced. The managers have again urged on the Lord Advocate the introduction of a compulsory measure. The remarkable immunity from fever, which, through the good providence of God, characterized the year 1858, such as had not existed in this city for thirty-five years, has continued through the past year. The number of patients admitted to the Fever Hospital, including small-pox, last year was 535, which exceeds the number admitted the previous year by 25. This slight excess is more than accounted for by the sudden outbreak of an epidemic of small-pox at the end of the year, which is still raging with considerable intensity. The number of small-pox patients at present in the house greatly exceeds the number admitted within so

¹ The actual number of cases of small-pox admitted into the Royal Infirmary of Edinburgh, for the last five years, has been supplied to me by Mr Macdougall, the able and active superintendent of that institution. As each patient may be held to cost at the very least three pounds, the actual loss sustained by an institution seldom finding its income exceed its expenditure, is placed in the last column, to show that even on this low economic ground the public suffer severely by the prevalence of this preventible disease:—

Years.	Numbers.	Average Cost.
1854-5	35	£105 0 0
1855-6	55	165 0 0
1856-7	133	399 0 0
1857-8	19	57 0 0
1858-9	126	378 0 0

short a time for many years past; and if, from the number of patients admitted into the Fever Hospital, there is deducted the number of small-pox cases, which amounted to 128, it will be found that the fever cases are even less this year than they were last. When it is considered that we possess in vaccination an all but certain prevention of small-pox—a means, if not altogether of prevention in every case, at least of great mitigation of its effects—it is to be regretted that in this country, where the discovery originated, so few should avail themselves of it. Of the security which it affords, there can now be no question; and the only difficulty which remains, is to overcome the apathy and ignorance which prevails to so great an extent on this subject. At present it is not merely in the poorer localities where this disease rages, but it will be found in the best streets and in the most spacious mansions of the city. It has long been observed that persons coming from the Highlands to large cities are especially liable to be attacked by this disease. Many female servants, labourers, and mechanics in this city come from the Highlands; and when small-pox appears, they are among its first victims, and are the means of propagating it among the families and in the houses and factories in which they are employed. It would be very desirable that the rule which prevails in some countries, that no person will receive employment, and that no child will be admitted into the schools, who does not produce satisfactory evidence of his having been vaccinated, should be adopted in this country.”

But passing, for a time, from these considerations, let us look at another aspect of the question.

§ 8. What number of cases is indicated by 645 deaths? Such an inquiry is attended with great difficulty, and the result can at the best be only conjectural; for it will be found from a table, implying great research, in Mr Simon's Report, that the fatality of small-pox, as it occurred in unprotected persons, ranged from under 15 (Carinthia) to 60 (Philadelphia) per cent.¹ The Bohemian returns, made with great accuracy for twenty-one years on four millions of people, make the deaths about 30 per 100 patients; thus, for every 30 dying, 70 will probably recover, so that a mortality of 645 would imply a total number of 2150 cases. But as this per-centage applies to the unvaccinated, and as when small-pox prevails epidemically a number who have been vaccinated will take it, and as, according to the same (Bohemian) calculations, the death-rate of vaccinated per-

¹ Rhazes the Arabian, Mead, Sydenham, and Huxham, all bear testimony to the great variety, in severity, of small-pox epidemics.

sons is only $5\frac{1}{6}$ per cent. of those attacked, the probability is, that a much larger number of persons than is indicated above will have passed through the disease.

§ 9. Great as is the evil of premature death, more especially from a disease which cuts off, not the surplus, but the valuable portion of life; and much as may be the amount of premature widowhood and orphanage, and the pauperism, thereby augmented, which may be caused, the evil does not stop with that. "Among those who outlive it (says De la Condamine, quoted by Mr Simon), many either totally or partly lose their sight or hearing; many are left consumptive, weakly, sickly, or maimed; many are disfigured for life by horrid scars, and become shocking objects to those who approach them. Another learned writer, after describing these frequent sequels of the disease, says, that its very nature is one *quæ nulla furcâ sese expelli patitur, sed usque recurrit*. Sir Gilbert Blane, at a later period, quoted a Report of the Hospital for the Indigent Blind, to the effect that two-thirds of those who applied there for relief had lost their sight by small-pox."

§ 10. It is true that the year 1856, on which the foregoing calculations are chiefly founded, is in some respects to be regarded as an exceptional year, inasmuch as small-pox was then epidemically present. In its form as controlled by vaccination, it shows the same tendency that it did when it presented its severest characters, to rapid and sudden alterations of prevalence. Thus, while the total deaths in Scotland from small-pox in 1856 were 645, in 1858 they fell to 175; and, in 1859, they rose again to 466. Illustrations of this tendency could be easily collected: one only need be cited from the extremely accurate returns of the Faculty of Medicine at Prague, which displays sudden changes in the prevalence of the disease, both before and after vaccination.

TABLE IV.

§ 11. *Illustrating the tendency of Small-Pox to sudden increase in prevalence.*
From the Prague Returns.

Year.	Before Vaccination.		Year.	After Vaccination.	
	Total Deaths.	Total from S. P.		Total Deaths.	Total from S. P.
1797	86,885	1,988	1838	108,419	62
1799	99,079	17,587	1840	118,471	699

§ 12. In the same way, it is recorded by Mr Cross, in his excellent *History of the Variolous Epidemic at Norwich in 1819*, that Norwich was nearly entirely free from small-pox from 1805 till 1818, when it was introduced by a girl from York. It spread rapidly from this focus, and also from three children who had been inoculated by a druggist for small-pox; and in that year Mr Cross is satisfied that “considerably above 3000 individuals, or a thirteenth part of the whole population of Norwich, had small-pox in that year.”

II. SMALL-POX AS IT WAS.

§ 13. It is very difficult, in the absence of reliable data, to obtain an accurate idea of the mortality occasioned by small-pox in Scotland previous to the common use of vaccination. The following table is offered, with the names of the observers, as perhaps the nearest approximation that can be made:—

TABLE V.

Mortality from Small-Pox before the introduction of Vaccination.

Observer.	Place of Observation.	Per-centage of Deaths from S.P. in Total Mortality.	Years.	Where Recorded.
Haygarth,	London, . .	16	1759–1768	Sketch of a plan, etc.
Watt, .	Glasgow, . .	18·82	1783–1800	On Chincough.
Dobson,	Liverpool, .	18	1772–1774	Haygarth, <i>op. cit.</i>
Percival,	Manchester, .	15	1769 1774	Med. Obser.
Nettleton,	{Eleven Towns} { in Yorkshire, }	19	...	Phil. Trans., 32.
Jurin,	18	...	Do.
Heberden,	London, . .	8½–9	...	{ Increase and Decrease of Diseases.

§ 14. Let a calculation be attempted on this basis for Scotland. Dr Watt’s Glasgow average (Table V.) seems to have been carefully prepared, and approximates remarkably to those of Nettleton, Dobson, and Jurin. But, assuming the mortality from small-pox to have been 18 per cent. of the whole population, the following approximative result would be arrived at:—

The mortality from all diseases in the eight towns in Scotland was, in 1856, 22,248; 18 per cent. of such a mortality would give, at the old rate, 4003 deaths from small-pox,—a number contrasting not unfavourably with the 645 which actually occurred.

It has been calculated, and apparently on good grounds, that

“were small-pox now let loose in its former virulence on the increased population of this country, it would sweep into the grave more than 50,000 every year, and leave many times that number in a state of debility which would predispose them to fall victims to other diseases, probably often becoming the parents of debilitated children; for no single disease ever contributed so largely and so directly to the deterioration and destruction of human beings as small-pox.”¹

§ 15. Another change, which will hereafter be of importance in the argument, is the different position in the social scale of those who fall victims to the disease.

Formerly, it might be said of small-pox, as of death itself—

“Pallida Mors æquo pulsat pede pauperum tabernas
Regumque turres.”

Mr Simon has given a sad catalogue of the victims furnished to small-pox from the royal families of Europe. “In the circle of William III., for instance, his father and mother died of it, and, not least, his wife, and his uncle the Duke of Gloucester; and his cousins, the eldest son and the youngest daughter of James II.; and he himself (like his friend Bentinck) had suffered from it most severely, barely surviving, with a constitution damaged for life. Or, again, in the court of Austria: ‘Joseph the First (says Vehse) was carried off, when not more than 33 years of age, by the small-pox; to which, in the course of the eighteenth century, besides him, two empresses, six archdukes and duchesses, an elector of Saxony, and the last elector of Bavaria fell victims.’ To this list might have been added, no doubt, many other names; among them, for instance, a dauphin (1711) and a king (1774) of France, a queen (1741) of Sweden, and an emperor (1727) of Russia. In one of Horace Walpole’s letters we read,—‘Lord Dalkeith is dead of small-pox in three days. It is so dreadfully fatal in his family, that besides several uncles and aunts, his eldest boy died of it last year; and his only brother, who was ill but two days, putrified so fast that his limbs fell off as they lifted the body into the coffin.’ It would be thought an awful epidemic now-a-days, that should strike like this in high places.”—(*Report*, etc., v. and vi.)

§ 16. Every medical practitioner has had more or less experience of small-pox; but I feel sure that every one will bear out the assertion that severe attacks of that disease are very unfrequent, and deaths

¹ *Brit. and For. Med. Rev.*, vi., p. 495.

exceedingly uncommon among the upper classes of society, and that the disease, when it does occur among them, usually presents that modified form which it assumes when it attacks those who have been vaccinated.

§ 17. Another and concluding remark under this head may be made, that Table III. distinctly shows that, as has always been the case, the largest proportion of the mortality takes place in children. This has perhaps been, without sufficient caution, attributed entirely to neglect of vaccination. Whereas it distinctly appears from the Chester Tables, 1772–77, that “nearly the same mortality took place between the ages of one and two, two and three, and three and five; and that between five and ten it did not exceed two-fifths of the mortality of each of the previous periods. It must at the same time be observed, that this diminution between the fifth and tenth year depends upon local causes, since few of the natives of Chester above seven years old had not been exposed to the variolous contagion.”¹

Enough has been stated to show the very marked change which has taken place in the prevalence and character of small-pox since the introduction of vaccination: whether the maximum of benefit which that discovery is capable of conferring has yet been attained, is our next subject of inquiry.

III. WHAT SMALL-POX OUGHT TO BE.

§ 18. The contrast afforded by the comparison between what small-pox was up to the beginning of the present century, and what it now is, in respect alike to its prevalence and to its severity, leads naturally to the inquiry, what the agency has been by which so striking a change has been effected, and how far that agency is capable of being further extended in its application and efficiency.

§ 19. The attempt to discover some protection against small-pox is of old date in its history. Boerhaave (Aphor. 1388–1392) discussed the possibility of preventing small-pox by internal medicines; but about the beginning of the eighteenth century,² the practice of inoculation, which had been resorted to in the East for ages, and which is said not to have been unknown in Scotland and Wales, was recommended by British physicians, who had witnessed in Constantinople and Smyrna the great success of the practice.—(Baron's *Life of Jenner*; Simon's *Report*.)

¹ Craigie's *Practice of Physic*, vol. i., p. 581.

² Lady Mary Wortley Montague's child, Edward, was inoculated in 1717 at Constantinople, and her daughter in England in 1722, being the first case in this country.

§ 20. In small-pox a virus is elaborated, which is found in the fluid contained in the pustules; this virus contains, as it were, the essence of the disease, and being inserted under the cuticle of a healthy person, it excites a local specific action, which is afterwards communicated to the system.

§ 21. There can be no doubt that the chances for the life of the patient were much greater under the artificial than under the natural disease; but still virus taken from the mildest case of small-pox might communicate the severest form of disease. Many died of the inoculated small-pox. But the chief objection to the practice was, that however great the advantage might be to the individuals inoculated with, and passing safely through the artificial disease, by multiplying the foci of contagion it tended progressively to augment the general mortality from small-pox.—(Heberden *on the Increase and Decrease of Different Diseases*, 1801; Moore's *History of the Small-Pox*.)

§ 22. In the history of the Norwich epidemic given by Mr Cross, already referred to, the inoculation of three children by an apothecary was a powerful means of diffusing the poison and increasing the spread of the disease; and in India, where the natives still practise it, it is found to cause a great increase of the disease. In 1840, chiefly by the exertions of Mr Wakley, a bill passed through Parliament rendering its employment in this country illegal.

§ 23. That its use will ever be resorted to again, is extremely improbable, although the late Dr George Gregory, of the London Small-Pox Hospital, believed "that the argument against inoculation, drawn from its supposed tendency to augment and multiply the foci of contagion, is not so forcible as the opponents of contagion invariably allege;" and that author seems to anticipate a time when "inoculation may co-operate with vaccination in the general design of mitigating the severity of small-pox" (*Library of Prac. Med.*, vol. i.).

§ 24. The very close of the eighteenth and the beginning of the nineteenth century witnessed the discovery and introduction of vaccination,—a method of procedure which, while it seemed to afford a protection as efficient as inoculation, was free from the two great objections to that practice—danger to the individual operated upon, and danger to those with whom that individual might come in contact.

§ 25. It is a law of epidemic diseases, subject of course to exceptions, that they seldom attack the same individual more than once. The protective power of vaccination, equally with that of inoculation, depends on the operation of this law. In the latter case, the

disease of small-pox attacks the patient in a modified, and usually a mild form; in the former, the poison becomes still further changed, and communicates a disease of the mildest possible character, but still sufficient in most cases to secure immunity from future attacks of small-pox.

§ 26. But to the law which has been stated there are exceptions. Individuals *may* have more than one attack of small-pox, and the second attack *may* be of a severe character; to such persons, neither inoculation nor vaccination can insure perfect security, and much of the doubt which has been thrown of late years upon the efficiency of vaccination seems to have arisen from the necessary occurrence of these exceptional cases having been lost sight of. It is a curious circumstance, that after inoculation had been some time in use, similar doubts as to its efficacy were started, arising apparently from the same exceptional cases. The early inoculators, like the early vaccinators, denied the possibility of the secondary occurrence of small-pox, dreading that such a belief might be injurious to the diffusion of the operation. But, says Dr Thomson (*History of Small-Pox*, p. 137), "Notwithstanding this unwillingness on the part of inoculators to admit the occurrence of secondary small-pox, cases of this kind have often presented themselves to the observation of medical practitioners, in the epidemic prevalence of this disease, at different times, and in various countries of Europe; and these cases have occurred in circumstances, and with symptoms, which do not appear to have left any room for doubt with regard to the genuine nature of the disease."

§ 27. Another great advantage which the practice of vaccination with cow-pox has over inoculation, is, that while epidemics of small-pox greatly increased during the prevalence of the practice of inoculation, they have greatly decreased since the introduction of vaccination. An ingenious writer in the *British and Foreign Medico-Chirurgical Review* (vol. xx.) shows, from the Report of the Epidemiological Society, that during 63 years, in which inoculation was practised, there was a ratio of 84 epidemics in 100 years; during the last 50 years (from 1807), the ratio is 24 epidemics in 100 years.

§ 28. The great alarm which at present prevails, not only as to the frequent occurrence of small-pox, but also as to the number of those previously vaccinated who are attacked by the disease, appears to arise from an opinion, once cherished by medical authorities, still pervading the public mind, that those who pass through cow-pox in a regular and satisfactory manner are, or ought to be, rendered *wholly* unsusceptible of small-pox contagion. Now, in every epi-

demic of small-pox a certain proportion of those who had suffered previously from the disease are found to be attacked a second time, and therefore it is only reasonable to suppose that a certain number of those who have been vaccinated will also suffer. Epidemics vary also in their power; and hence, during the prevalence of certain epidemics, an unusual number of those who are still liable will be attacked. It seems to have been established in all the outbreaks of small-pox, that certain individuals who seemed proof against contagion in one epidemic succumbed to it in another.

§ 29. The following conclusions, arrived at by the Faculty of Medicine at Prague, and appended to Mr Simon's Report, put the whole case on so clear and satisfactory a footing that I make no apology for quoting them entire:—

“1. Small-pox not only may, but does attack even persons who have been successfully vaccinated.

“2. Death from small-pox occurs not only with non-vaccinated, but also with vaccinated individuals.

“3. Vaccination with cow-pox does not, therefore, secure a certain safety from small-pox.

“4. The number of small-pox cases in general (vaccinated and unvaccinated), in proportion to the number of the population, is, at the present time, unproportionally smaller than before the introduction of vaccination.

“5. If the proportion of small-pox patients who have been vaccinated greatly exceeds that of those who have not been vaccinated, this fact must not be lost sight of, that in the present day (in this country) the population of non-vaccinated individuals is very much smaller, and with the spread of vaccination for cow-pox it decreases each year.

“6. The greatest number of small-pox cases which terminate fatally in the present day, is not only much lower than the highest number during a like period in times before the introduction of vaccination, but even in an extraordinary degree lower than even the lowest number in such former times.

“7. The great variability of small-pox cases and deaths observed in the different years, shows that now, as formerly, the small-pox at times takes a greater range; at the same time experience teaches

“8. That, in comparison, a greater number of non-vaccinated persons (notwithstanding their great minority) are attacked with small-pox and die, in almost the same proportion as before the introduction of vaccination; whilst,

“9. As regards vaccinated persons, notwithstanding their overwhelming majority, the favourable comparison shows itself in an

extraordinary manner, inasmuch as the cases which terminate fatally may almost be termed singular, when it is taken into consideration that in forming these conclusions only the successful cases of vaccination could be reckoned."

§ 30. Observing, as we do, that in the prevalence of epidemics the non-vaccinated exhibit the disease in as severe a form as was ever witnessed in its history, and yet that the mortality from it is so much diminished, and also that those severe cases are seldom seen in the upper classes of society, the conclusion becomes irresistible, that we are indebted for these modifications of the disease to the practice of vaccination; and that, were that practice as general and as carefully performed among the lower as it is found to be among the upper classes of society, they might enjoy an equal share in its protective power.

§ 31. That small-pox will ever be entirely exterminated by it is very doubtful, when it is remembered,

1st, That small-pox spreads epidemically as well as by contagion.¹

2d, That there are individuals to whom neither a previous attack of small-pox nor vaccination affords immunity from a subsequent attack of the disease; but, though isolated cases might occur, yet were vaccination universally practised, they would be surrounded, so to speak, by non-conductors of the contagion, and thus the spread of the disease from each focus of contagion would be to a great extent prevented.

§ 32. The mortality from small-pox in the unvaccinated, taken generally, is 35 per cent. of those attacked, but of children under five years of age it is 50 per cent.; the mortality, on the contrary, among the vaccinated attacked by small-pox, is 7 per cent. taken generally. But among what may be characterized as the badly vaccinated, it is 15 per cent.; among the well vaccinated, 1 per cent.—(Mr Marson's *Petition to House of Commons on Vaccination Bill*, 1856.)

§ 33. The deaths from small-pox in Scotland are never less than 2 per cent. of the whole annual mortality in the eight large towns, and in January 1856 were as great as 30 per cent. in one of them. It appears, by evidence collected by the Epidemiological Society, that since compulsory vaccination was resorted to, the fatality of small-pox in Copenhagen is but an eleventh of what it was; in Sweden, little over a thirteenth; in Berlin, and in large parts of Austria, but a twentieth; in Westphalia, but a twenty-fifth. In the

¹ The existence and spread of small-pox epidemically, though urged by Al-Rhasi, Sydenham, Hoffmann, Boerhaave, Ramazzini, Frank, and many others, was, nevertheless, denied by Scuderi and Haygarth.

last named instance, there now die of small-pox but four persons, where formerly there died one hundred.¹—(Simon's *Report*, p. xxiii.)

§ 34. The Registrars' returns afford ample evidence of the extent to which we are indebted to the neglect of vaccination for the spread of small-pox. A few examples may suffice.

Thus, Registrar-General's Quarterly Report, for quarter ending 30th June 1855,—

“This loathsome disease (small-pox) has, owing to the neglect of vaccination, broken out in rather a virulent form in several parts of Scotland.”

Again, in the quarter ending Dec. 31, 1856, he writes,—

“Small-pox has been very general over Scotland, and caused the loss of many lives. It will be seen from the Registrars' Notes, a few of which are appended, that the deaths from that loathsome disease have been almost everywhere confined to those who had not been vaccinated; and these notes are all the more valuable, as coming from men who may be presumed to have no medical theory to support, and who are recording facts, the truth of which they have personally ascertained.”

“Thus, the Registrar of Glamis, in Forfar, says: ‘Of upwards of thirty cases of small-pox, three only proved fatal; and from inquiries made, I find that in almost all the other cases pre-vaccination had taken place. None of the three (who died) had been vaccinated.’ The Registrar of Bonhill writes: ‘Since the Registration Act came into operation, in every case of small-pox that proved fatal the party invariably had not been vaccinated.’ The Registrar of Hawick states, that small-pox was very fatal during the quarter, and all the deaths have occurred in the case of persons not vaccinated. The Registrar of Kirkmichael, in Ayr, says: ‘In the village of Kirkmichael, with a population of about 600, there have been upwards of 100 cases of small-pox; and it is worthy of remark that no child under five years of age who had been vaccinated was affected.’”

Again, in the Report for the first quarter of 1857, the Registrar-General writes: “Small-pox has broken out at different parts of the country, but the mortality has been trifling wherever vaccination has been attended to. In some places, where the vaccination of the young appears to have been much neglected, the mortality from small-pox has been very high. Again, in the report for the succeeding quarter: “Small-pox manifested itself in several districts;

¹ These calculations, however, cannot be recorded without the caution that in the worst days of small-pox, it often disappeared from certain localities for a time.

but, as usual, the fatal cases were in almost every instance confined to those who had not been previously vaccinated. Thus, the Registrar of Alyth, in Perthshire, remarks: ‘There have been many cases of small-pox here during the quarter, but not one has proved fatal where vaccination was attended to.’”

During the prevalence of small-pox in Dundee, in 1856, the Registrar of the second district in that town observes:—

“Since this disease (small-pox) broke out last year, I have been carefully observing the various cases (deaths?) registered; and from these observations, and the information I have acquired by conversing with the parents and medical men of the district, I am under the conviction, that if the vaccination of their children was rendered imperative on all parents, the severity of the disease would be greatly mitigated and many precious lives would be saved. In confirmation, I may state that out of the last thirty cases (deaths?) I have registered, there has not been one child that was properly vaccinated; and that there are several families who have lost one or more of their children who had not been vaccinated, while their other children who were ill at the same time, who had been vaccinated, recovered.”

§ 35. The following passage is extracted from an interesting pamphlet by Dr Wallace of Greenock,¹ for the perusal of which I am indebted to Mr Macfarlane, the Sheriff of Renfrew:—

“There is one contagious disease which can actually be averted, or at all events shorn of its terrors, without having recourse to the practice of segregation, namely, small-pox; but which, from the neglect of the simple precaution of vaccination, is still allowed to commit considerable ravages on the community. . . . It acquired a high degree of virulence, and was ultimately the means, in a single year, of sending to the Infirmary no less than 54 cases” (the estimated population of Greenock was 37,772 in 1851), “over and above those who remained in their own houses. And among whom did it chiefly prevail, and over whom did it exercise its fatal influence? Why, the unvaccinated. Nor, were they unvaccinated for want of opportunity. . . . For many years vaccination has been freely offered at the Dispensary to those who could not afford to pay for it; the district surgeons, moreover, having for the last two years, by order of the Board of Supervision, been ready to vaccinate, free of charge, any who might choose to apply, and no matter

¹ *Observations on the Causes of the Great Mortality in Greenock, etc.*, by James Wallace, A.M., M.D.

what their station in life. And yet it is lamentable to think how few take advantage of a boon so precious.¹ Even of those who do bring their children, but a very small number return to show whether the operation has been entirely successful."

§ 36. An opinion has been maintained, that the protective power of vaccination becomes gradually weaker, and at length apparently dies out, in the individual. It may be admitted that there is ground for a suspicion that this may in part be true; and that as, after childhood, the susceptibility to small-pox increases from fifteen to twenty-five years, revaccination about puberty will always be a safe precautionary measure.

§ 37. Another opinion has been hazarded, that the vaccine lymph has lost its power, to a certain extent, by its passage through numerous human bodies, and that it would be well to recur from time to time to the cow for a supply. There can be no doubt that the effect produced by matter direct from the cow is often more severe than that from matter transferred from one child to another, especially in the febrile disturbance; and the experiments of Gregory, Field, and Steinbrenner have shown that the matter taken from the human subject does not produce all the effects of that from the cow. The National Vaccine Establishment, however, state in their Report for 1854, "that the vaccine lymph does not lose any of its prophylactic power by a continued transit through successive subjects."

IV. SUGGESTIONS FOR LEGISLATIVE INTERFERENCE.

§ 38. England has two Vaccination Acts,—Scotland has not one. "Bearing in mind," says Dr Seaton, "that in no country in Europe, which furnished returns to the Epidemiological Society, is the average mortality from small-pox so high as in London, or in England and Wales generally, in either of which it constitutes about $1\frac{1}{2}$ per cent. of the mortality from all causes; bearing in mind that the proportional mortality in London has never, during the last ten years, attained 3 per cent., we read with amazement and regret, that in Aberdeen, in July 1856, small-pox caused 10 per cent., in Edinburgh $5\frac{1}{2}$ per cent., and in Paisley 5 per cent. of the total mortality; and that Paisley and Leith should now (1857) be going through epidemics similar to that which, at the commencement of last year, was so fatal in Dundee" (30 per cent.). The cause of this high mortality has been shown, by the inquiries of the Registrar-General and district re-

¹ The surgeon of the poorest and filthiest district of the town informs me that only twenty-four persons applied in 1859 for gratuitous vaccination.

gistrars, to be the neglect of vaccination. This was demonstrated in 1857, in a Report presented to both Houses of Parliament; but up to this time, no attempt has been made to remedy so glaring a defect in our sanitary state. (See *antea* paragraph 33.)

§ 39. The only regulation respecting it is contained in an order of the Board of Supervision, dated 21st October 1848, requiring every parochial medical officer to be at all times furnished with vaccine virus, and to vaccinate without charging a fee, at stated times and places to be named by the Parochial Board, all persons who may come or may be brought to him for that purpose. Another minute of the Board of Supervision, dated July 13, 1854, explains that the gratuitous vaccination is not to be limited to paupers, but to be extended literally to *all* persons claiming it.

§ 40. It would not require a very careful investigation to show that these rules are, in most country districts, entirely inoperative. At first, medical men attended at the stations; but finding that infants were not brought,—although they had travelled great distances without remuneration to meet them,—they fell back on the rule compelling them, if they disappointed the parents by non-attendance at the stations, to vaccinate the infants at their own houses. In many extensive parishes, no applications for vaccination under the rules of the Board are ever made.

§ 41. The first grand error in these regulations, is similar to one which may be held to lie at the bottom of much of the inefficiency of the English Compulsory Act,—the placing the arrangements under the charge of the Poor Law Boards. In this case, as also in that of the enforcement of the Nuisance Removal and Diseases Prevention Act, we cannot look upon authorities constituted merely for the control and relief of paupers, as the fitting body to whom to commit measures of sanitary police.¹ The opinion of the Epidemiological Society may be quoted on this point:—

“It is manifest, in the first place, that the vaccination of the people, which is a measure undertaken by the State for the security of the public, has nothing in it of the character of alms, and does not fall properly under a department of Government whose sole function is the distribution of alms.”—(*Report*, 1855, p. 4.)

§ 42. To this cause much of the opposition which the Act has met with both from the public and from medical practitioners in England may be ascribed;² and one can scarcely refuse to sympathize with the

¹ For some admirable remarks on this, see Rumsey's *State Medicine*, Essay iv. chap. 4.

² For numerous instances of this, see Rumsey, p. 380 et seq.

reluctance of parents in the more independent classes of society, to send their children, along with those of paupers, to a public vaccination station, there to have the operation performed by a public officer,—a perfect stranger to them, it may be,—and paid by the Poor Law guardians.

§ 43. Security ought, however, to be taken, that the operation is efficiently performed. We admit that there is room for improvement in this respect, though we cannot see any ground for the late very sweeping regulations of the Privy Council,—as yet only applicable to England. By these, it is proposed to take vaccination out of the hands of the profession altogether, and to place it in charge of certain individuals specially educated for the purpose. We consider this as degrading to the profession. If a practitioner holding a qualification in medicine and another in surgery,—as he must do before obtaining a Poor Law appointment,—is unable to perform the simple operation of vaccination, let the authorities in our medical schools, and especially let the General Council of Education, look to it.¹ But is there any evidence of this to an extent to require so obnoxious a regulation? It is admitted that, among the lower orders, inefficient vaccination does prevail; but not so much from ignorance, as from carelessness on the part of the medical attendant, and still more on that of the parent. The mere operation is so simple, that the failure cannot be in the method of its performance, and must consist in neglect to watch the subsequent progress of the vesicle; and can this be wondered at, when one shilling and sixpence is considered sufficient pay for an educated medical man, for vaccinating, inspecting, once at least,—travelling, possibly, four miles each visit, or eight in all,—keeping three separate entries, and granting two certificates! The face of a legal gentleman called on to do the same amount of work, for the same pay, would be an interesting study to the physiognomist!

§ 44. The recent order of the Privy Council appears to have been suggested by Mr Marson's paper and elaborate tables, published in the *Med.-Chir. Transactions*, vol. xxxvi. Now, the test which Mr Marson assumes to determine the character of the vaccination, and on which he decides that vaccination is often inefficiently performed, is the cicatrix.

Mr Marson says, "The most trustworthy evidence we can generally obtain of its perfection, is from the cicatrices." Now, tried by a

¹ Our Examining Boards should require a certificate that every applicant for their license has seen and watched the progress of a certain number of cases of vaccination.

much more delicate test—that of revaccination, the Wirtemberg physicians were led to conclude, according to Heim, that little or no reliance is to be placed on the character of the cicatrix. “It was ascertained,” says a reviewer (*Brit. and For. Med. Rev.*), “that the pustules of genuine cow-pox (analogous in this respect to small-pox) may leave an imperfect mark, or even no mark at all; and that, on the other hand, to depend upon the regular appearance of the mark, as a sign of protection, was only to adopt a dangerous error, and to lull the public into a state of false and dangerous security. The circumstances attending the epidemic prevalence of small-pox, as well as the effects of the revaccination, prove that the cicatrix-theory is untenable.”

§ 45. Nor can we, consistently with any admitted theory of the operation of cow-pox as a protective, recognise the necessity of making numerous punctures in the operation of vaccination.

§ 46. Another error in the English Compulsory Act would appear to have been the fixing of the age of three or four months as the extreme limit for vaccination. That the bringing of young infants to vaccination stations in inclement seasons must be most dangerous, few will be inclined to dispute; and in many of the continental states, where the mortality from small-pox is at the lowest, vaccination is not enforced under one year.

§ 47. The limits of this paper do not allow of my entering into a full historical account of the various proceedings of the Legislature for the suppression of small-pox, but the following summary, chiefly abridged from Mr Rumsey, will be found useful.

They may be arranged chronologically into four stages.

§ 48. The first commenced with the establishment of the National Vaccine Institution in 1809, the main designs of which were administrative and practical, not scientific. Extensive vaccination, collecting and distributing gratuitous supplies of vaccine lymph to all parts of the country, were the duties of the institution; and, as remodelled in 1833, this is effected by a staff of one inspector, sixteen stationary vaccinators, and a registrar. Its station and officers are confined to the metropolis, and it has no definite administrative authority.

§ 49. The second commenced with the passing of the first Vaccination Act, in 1840 (generally known as Lord Ellenborough's Act), which applied to England, Wales, and Ireland, but not to Scotland.

It requires Boards of Guardians to contract for the gratuitous vaccination of all persons resident in their respective unions or parishes, the expense being defrayed out of the poor-rates. The Poor Law Board is required to approve of the contract. The public

vaccinators are required from time to time to report the number of persons vaccinated by them. It prohibits inoculation with variolous matter. It declares vaccination under this Act not to constitute parochial relief or alms.

§ 50. In reference to this Act, Mr Rumsey (*op. cit.* p. 374) observes: "It is true that the Central Poor Law Board made repeated efforts, and displayed the utmost anxiety to carry into effect the beneficent designs of Parliament; but the inadequate arrangements made in most unions, the repulsive character of a poor law sanitary provision, and the pitiful semblance of remuneration paid by contract for the performance and record of public vaccination (not to mention other previously existing obstacles), checked the operation of this unpopular measure, and led to renewed discussion and agitation."

§ 51. The third stage commenced by the able report of the Vaccination Committee of the Epidemiological Society, and issued in 1853 in the passing of the second Vaccination Act (Lord Lyttleton's Act).

§ 52. This Act still attempted to carry out vaccination by that machinery which had proved so inefficient and objectionable. It made no attempt to connect the working of the new system with the National Establishment, set up in 1809; it offered no adequate inducement, as Mr Rumsey remarks, to the public vaccinators to insure the permanent success of their operations; it made no provision for overtaking the existing unvaccinated population; it set the population against it by requiring vaccination to be performed within three months; and we have only to glance at the quarterly returns of the Registrar-General to see how, from every district of England, complaints come up in the notes of the local registrars, that the Act is practically a dead letter.

§ 53. Its chief provisions are—

1st, The guardians of the poor are to divide unions into vaccination districts, and to appoint a place in each district where the medical officer or practitioner contracted with should attend to vaccinate.

2d, Every child is to be taken to the district vaccinator within three (or in certain cases four) months after birth, unless previously vaccinated and certified by some duly qualified practitioner; and to be taken for inspection on the eighth day after the operation.

3d, Registrars of births were to give notice of the requirement of vaccination; and on failure of the parent or guardian to comply, a penalty of twenty shillings was to be enforced.

4th, The penalty is not to be exacted where a certificate of unfitness for or of unsusceptibility to vaccination has been given.

5th, All who vaccinate (publicly or privately) are required to give certificates of successful vaccination to the parents and registrars.

6th, The contractor for vaccination is to receive 1s. 6d. for each case within two miles of his residence, and 2s. 6d. if beyond that distance.

No parties are, however, instructed to sue for the penalties against those who neglect vaccination; no payment is given to the medical man for the two certificates he is required to furnish, nor is there any provision made to secure its performance.

The fourth stage dates from the Privy Council Regulations of last December, which annuls that portion of the Vaccination Acts which render vaccination contracts open to all qualified practitioners, and declares that for the future the holders of such contracts must be taught vaccination specially, by certain teachers specified in the orders, or by others to be named from time to time. This order has been elsewhere commented on. (§ 43.)

§ 54. To suit the requirements of Scotland, no very complicated Act would be required, and any reasonably judicious measure would be certain to carry with it the support both of the profession and the public.

§ 55. The only point on which the slightest difference of opinion is likely to arise, is as to whether vaccination should or should not be made compulsory. Some, looking at the result of compulsion in certain despotic states, would contend for the most rigid compulsion enforced by penalties; others, looking at the natural resistance which compulsion in such matters is sure to awaken, and the bad feeling which may thus be engendered, would prefer to secure the same end indirectly, by attaching certain advantages to the holders of vaccination certificates and withholding these from the unvaccinated.

§ 56. Mr Rumsey, to whose admirable essay I have already been so largely indebted, points out that "the idea of compulsory vaccination in the minds of many has been vague and inaccurate;" that "in many European states, which were cited by the Epidemiological Society as precedents for a compulsory enactment, and in which is reported the lowest mortality from small-pox, the compulsion is only indirect,—that is, it is made essential to admission into schools and asylums, or a necessary qualification for citizenship, or apprenticeship, or domestic service, or relief from the public funds."

Direct compulsion by fine is the law apparently in only four of the states mentioned in that elaborate and valuable report. In two

of the four (Hanover and Bavaria) the vaccination is annual, and is performed at the most favourable period of the year. The majority of infants, therefore, are not vaccinated until they are more than a year old. In Prussia there is no liability of fine for non-vaccination under a year. And in Sweden, where the mortality from small-pox appears to be at the lowest rate of any in this group, the compulsory measure applies only to children more than two years old; and even then reprimand is tried for a time, and the fine only resorted to as an ultimatum.

§ 57. A sufficient number of efficient inspectors, visiting reculant parents and dealing with them in the way of kindly suasion and remonstrance, would probably effect the desirable result. Such inspectors need not be a separate staff, for the duty could easily be undertaken by the gentlemen already attached to the registration districts.

§ 58. While this sheet is passing through the press, I have had put into my hands, by the President of the Medico-Chirurgical Society, a book presented to that body by its author, a veteran in our profession, Dr Clement Carlyon of Truro.

So long ago as 1840, Dr Carlyon had a correspondence relative to vaccination with the London Board of Poor Law Commissioners, at the request of the Guardians of the Truro Board. His object was to show the necessity of the appointment of inspectors to overlook the due carrying out of the Act. It might be well that the working of the Act were committed to a Board, the head of which might not only correspond with the district vaccinators, but visit each district from time to time to see that the Act is properly complied with.

§ 59. In the first place, it would be exceedingly unwise that Scotland should be left dependent for its supplies of pure lymph on the London Vaccine Establishment; a central depot should be provided in Edinburgh, with corresponding ones in every town having a population sufficient to support it. These, in the towns which are the seats of medical schools, would also afford the means of instructing students in vaccination.

Mr Ceely,² in his communications with the Secretary of State in 1853, stated it as his opinion, that a station for weekly careful vaccination could not be maintained by its own operation, and with advantage to the public, in any population less than 60,000.

¹ *Precepts for the Preservation of Health, Life, and Happiness.* London, 1859.

² By the kindness of Mr Ceely, I have had an opportunity of perusing these communications, and trust that they will yet be published.

Only four towns in Scotland have a population over 60,000.

Glasgow, with an estimated population of 388,537, and 15,887 births annually, would support six stations.

Edinburgh, population 182,464, annual births 5186, would support three stations.

Dundee, population 94,299, births 3475, one station.

Aberdeen, population 80,429, births 2396, one station.

Eleven stations could thus be established in Scotland, ten of which would be at the seats of the medical schools, and no town having a medical school would be left unprovided. The vaccinators at these stations should of course be salaried, and be bound to furnish lymph of good quality, free of expense, to all applicants. The immense facility for this afforded by the ingenious method of preserving lymph fresh and fit for use, protected from all decomposing agents, introduced by Dr Husband¹ of this city, and now recommended by the Privy Council, will be appreciated by all who have employed it.

While the population of these towns is such as to maintain the number of stations stated above, I by no means consider such a number essential. Dr Husband's method would soon render every practitioner almost independent of a central supply, and thus tend to reduce the necessity for central stations. These stations should be merely offices, where vaccination is carefully performed weekly, and where a regular supply of lymph is maintained. For the practical purposes of vaccination, especially in rural districts, I believe it would suit the convenience both of the medical men and of the parents, and be of consequence in avoiding exposure to the infant, were the vaccination performed at the residence of the child.

§ 60. The machinery for securing universal vaccination should be transferred from the Poor Law Board to the registration officers. Let each parent, on registering the birth of a child, be furnished with a blank form to the following effect, which should be returned by him to the registrar within a year, signed by a duly qualified medical man, under a penalty :—

I ———— qualified and registered as a (a)
under the Medical Act, hereby certify, that I duly vaccinated (b)
on the day of 186 , by (c) punctures; that
I saw the child (d) days after, and the vesicles exhibited the ap-

¹ *Exposition of a Method of Preserving Vaccine Lymph Fluid and Active*, etc.
By William Husband, M.D., F.R.C.S. London, 1860.

pearances of the true Jennerian vesicle, as laid down in the official instructions to vaccinators, or (here insert any deviations).

(Sign here) _____.

Dated at _____

(a) Physician, Surgeon, or Apothecary.

(b) Name of child.

(c) Number.

(d) Number.

3d, All paupers should be entitled to apply for vaccination for themselves and children to the parochial surgeon, who should receive a suitable fee for each operation and for furnishing the certificate.

4th, Parents, not paupers, but who may object to pay for vaccination, should be furnished by the inspector of the poor with an order on the parochial surgeon, who should then vaccinate, and be paid by the Board.

5th, Penalties should be inflicted for false or fraudulent certificates.

6th, No one should be admitted into any public employment, or into any workshop or factory, where numbers are employed, or into any school under Government inspection, without the production of a vaccination certificate.

By these means, the general diffusion of vaccination might be anticipated, and the mitigation of the severity of small-pox epidemics realized.

To carry out these objects, a memorial was submitted, in 1859, by the Colleges of Physicians and Surgeons of Edinburgh to the Lord Advocate, in which the lamentable neglect of vaccination was set forth, and the heads of a simple measure for remedying it suggested. Such a bill would only require nineteen clauses, the nature of which may be shortly indicated.

1st, Preamble, pointing out the necessity of such a measure.

2d, Interpretation clause, defining terms used in the bill.

3d, Act to apply to Scotland, and to be in force from 1st Jan. 1861.

4th, Expenses of execution of Act in each district to be borne by the registration assessment except as provided by clauses 11 and 12.

5th, Vaccination not to be considered as poor law relief.

6th, The registrar of each district to deliver to every one registering a birth a blank form of certificate. (*Vide antea* § 60.)

7th, On such a certificate being returned, the registrar to enter it in register of births.

8th, The registrar to transmit to procurator-fiscal the names of parties in arrear of certificates.

9th, When vaccination has to be delayed from bad health or any

other cause, a certificate to that effect to be sent, and to sist prosecution.

10th, When vaccination has not taken effect after three vaccinations, at intervals of three months, a certificate of insusceptibility to be sent to registrar, and to bar further procedure.

11th, Provision for vaccinating at charge of Parochial Board, and by parochial surgeon, all persons on the poor roll and their children.

12th, Allowing inspector, after inquiry, to issue a warrant for vaccination, gratuitous to the individual, but at the expense of the Parochial Board, to all persons not actually paupers, but who satisfy him that they are unable to pay a fee for vaccination.

13th, Provision for securing vaccination in emigrant ships, poor houses, jails, schools, and all other institutions supported wholly or in part at the public expense; as well as in factories, for admission to which a surgeon's certificate regarding age is at present required.

14th, Provisions for securing the vaccination of the adult unvaccinated population.

15th, Provision for the yearly vaccination of all unvaccinated persons in each district, for the re-vaccination of those arrived at puberty and others who may wish it.

16th, Penalties, and their recovery.

17th, To forbid inoculation, and to impose penalties to prevent persons recently convalescent from small-pox, travelling in public conveyances.

18th, The due performance of the Act in each district to be watched over by the superintending Registrars, and the Registrar General to report annually to Parliament on execution of Act; or, it should be considered necessary to appoint a Vaccination Board or a General Inspector, this duty to devolve on them or on him.

19th, Short title.

As at present the children of all parents on the poor-roll are vaccinated, and as in the upper classes of society vaccination is universal it is only unvaccinated adults and the floating population immediately above pauperism that would require to be dealt with, so that the expense of carrying out the Act would not be great, especially as existing machinery would be made available.